KiPPRA
The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS

Achieving Universal Primary School Education in Kenya

Rob Vos
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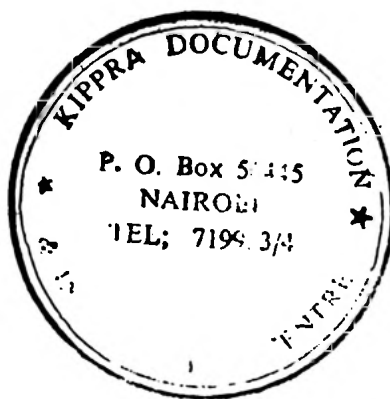**THE KENYA INSTITUTE FOR PUBLIC
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(KIPPRA)**

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Social Sector Division
Kenya Institute for Public Policy
Research and Analysis

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The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research, leading to policy advice. KIPPRA's mission is to produce consistently high-quality analysis of key issues of public policy and to contribute to the achievement of national long-term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well-researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the government and the private sector may obtain information and advice on public policy issues.

Abstract

The Kenya government has given education a high priority as a vehicle of national development. As a result, the national education system has expanded rapidly since independence. Before the implementation of free primary education in the year 2003, the government was spending over 55% of its education expenditure on primary school education. Teachers' salaries constituted over 95% of the fiscal resources allocated to primary school education. Despite Kenya's high level of expenditure on education, primary school enrolment has been declining since early 1990s until 2003 when gross primary school enrolment increased to 103% after the introduction of free primary education. However, with an estimated net primary school enrolment rate of 77%, Kenya is far from achieving universal primary education. Allocation of resources within the education sector seems to be ineffective because the increasing expenditure on education goes to recurrent expenditure to pay teachers' salaries. Kenya's Poverty Reduction Strategy Paper (PRSP) and the Economic Recovery Strategy for Wealth and Employment Creation outline education targets for reaching education for all by 2015. For the education targets to be realized, the available resources need to be allocated efficiently. This paper uses the Budget Negotiation Framework (BNF) to analyse cost effective ways of resource allocation in the education sector. The BNF is a tool that aims at achieving equity and efficiency in resource allocation. Results from the analysis show that provision of education for all in Kenya by the year 2015 is a feasible target.

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1.   Introduction

Education is an investment in human skills. Education investment helps to foster economic growth, enhance productivity, contribute to national and social development, and reduce social inequality (Council of African Ministers of Education, 2000).

Kenya has given education a very high social priority since independence. Expenditure on education averaged between 5 and 7 percent of GDP between 1991/92 and 2002/03 fiscal years. The level of educational expenditure declined in real terms during the early 1990s, but rose to previous levels thereafter (Kimalu *et al*, 2001). According to Deolalikar (1998), Kenya appears to be spending significantly more on education compared with other African countries. Kenya's expenditure on education was 6.7 percent of GNP in 1995 compared to 5.1, 4.7, 4.0 and 2.6 percent for Burundi, Egypt, Ethiopia and Uganda, respectively (Kimalu *et al*, 2001). At its level of expenditure on education, Kenya should have a gross primary school enrolment rate of about 110 percent and gross secondary school enrolment of about 45 percent (Government of Kenya, 1998a). Despite the high education expenditure, gross primary and secondary school enrolment rates in Kenya have been declining in the 1990s. Gross primary school enrolment declined from 98.2 percent in 1989 to 88.7 percent in 2002, while secondary school enrolment rate dropped from 29.4 to 23.0 percent during the same period.

The government has since independence committed itself to providing universal education to all primary school-going age children. This commitment initially took the form of free primary education in the 1970s. Free primary education was later abolished under the Structural Adjustment Programmes (SAPs) of the 1980s, meaning that parents had to contribute more towards the education of their children through a cost-sharing programme. One of the consequences of cost sharing has been decline in school attendance and enrolment, since all parents were

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required to cover full costs of their children's education (Bedi *et al*, 2002; Kimalu *et al*, 2001). These costs cover uniforms, textbooks, and other instructional material. Also, parents were to contribute to school construction and maintenance. Further, inadequate provision of complementary inputs like textbooks significantly reduced the effectiveness of teachers.

Although the cost of primary school education was borne by the government and households before the re-introduction of free primary education in 2003, the share of public expenditure in the total education budget is still large. As of 1987, more than 35 percent of total public sector recurrent budget went to the education sector, compared to 15 percent in the 1960s and 30 percent in 1980. The government currently spends more than 50 percent of its education expenditure on primary school education. Teachers' salaries take about 96 percent of the fiscal resources allocated to primary education. There is clearly need for efficiency-enhancing measures in the education sector.

Before the introduction of free primary education in 2003, most of the resources allocated to the education sector were consumed by the teachers' wage bill. Salaries to teachers consumed more than 75 percent of the education budget. Within the primary and secondary school budgets, teachers' salaries accounted for 95-97 percent of recurrent expenditure. As a result, there were hardly any public resources left for other school requirements such as learning material and textbooks.

The Kenya Poverty Reduction Strategy Paper (PRSP) and the Economic Recovery Strategy (ERS) for Wealth and Employment Creation have spelt out education targets for the country. These targets are in line with the Millennium Development Goals (MDGs) of universal primary education by the year 2015[1]. Given that the Government is faced with

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[1] Kenya's target for Universal Primary Education is the year 2005.

various financial constraints, there is need to allocate the available resources more efficiently for Kenya to achieve the universal primary school targets. This paper focuses on cost-effective ways of achieving universal primary school education targets by the year 2015.

2.   Free Primary School Education

The Kenya government first expressed its intention to offer free primary education almost three decades ago. Education was declared free for children in standards one to four in 1974 and for the entire primary school cycle in 1978. Following the implementation of Structural Adjustment Programmes (SAPs) in the 1980s, the government reneged on the free education reforms, and parents and communities were from thereon required to contribute to their children's schooling. Cost sharing in education was introduced in the mid 1980s. Parents continued paying tuition, buying books and desks because the government lacked adequate resources.

One of the pledges of the new government elected in 2002 was to provide free and compulsory primary school education. Once in office, the government moved with speed to provide free primary education in line with the Millennium Development Goals, Poverty Reduction Strategy Paper (PRSP) and the Economic Recovery Strategy (ERS) for Wealth and Employment Creation. An estimated 1.5 million children, who were previously out of school, have joined primary school since the introduction of the programme.

The government, with assistance from development partners, has availed resources to finance the free primary education programme. During the 2003/2004 financial year, about Ksh 9 billion additional resources were allocated to the programme. The additional resources catered for provision of textbooks, stationery, science kits and other instructional materials to primary schools. The allocation of funds is based on the total number of students in a school.

Although the policy of free primary school education has received a lot of praise, its implementation is besieged with numerous challenges, which include the unavailability of physical facilities, school furniture, equipment and teachers, among others. This has led to overcrowding

in classes and overburdening of teachers, and could have a negative effect on the quality of education.

Although about 1.5 million children have joined primary school since the introduction of free education, many school-going age children are still out of school. Gross primary school enrolment rate was 104 percent in 2003 but the net primary school enrolment rate was estimated at 77 percent. The 1999 population projections (Government of Kenya, 2002) show that the primary school-going age population will be 7.02 million in 2004 and 7.09 in 2005. Therefore a national net enrolment rate of 77 percent translates to 1.6 million children out of school. A combination of factors, including poverty, social problems, child labour, displacement, and lack of schools and teachers may have contributed to the low enrolment rate. The large gap between gross and net enrolment may be explained by enrolment of tens of thousands of "over-age" children, including street children, or those who dropped out of school to work and have rejoined school. For instance, in the Mukuru slum area of Nairobi, only about 500 of the 5,000 new students (10%) who enrolled in schools since the beginning of the year, were of "normal" school-going age (IRIN, 2003).

A recent survey (Oxfam, 2003) revealed that 37.3 percent of children in Kibera, in Nairobi, are still out of school and the majority of those in school (70%) are attending non-formal primary schools. This problem has been compounded by the fact that almost no new schools have been built in slum areas for the last 15 years, although large populations of the city live in slums.

The Kenyan government plans to finance most of the core costs of free primary education out of its own resources. According to Oxfam (2003), Kenya needs an additional US$ 137 million between now and the year 2015 to make education for all a reality. This would enable the government to provide extra help to the poorest children, including those in slums and those affected by HIV/AIDS.

Abolishing school fees is the first step to achieving universal primary education. However, as experience in Kenya and Uganda has shown, there are other issues such as child labour that need to be addressed. According to the 1998/99 child labour survey, about 30.1 percent of parents released their children to work in order to help family business while 27.5 percent indicated that earnings from their children's work augmented household income. Only 0.3 percent of parents reported that they released their children for work because they thought their education or training environment was not suitable. Other challenges for the government in providing universal primary school education include uneven distribution of teachers in Kenya's schools.

3.   Education Problems and Targets

Education is the main single factor strongly associated with the probability of reducing poverty. Improving educational performance should therefore form a core element in the poverty reduction strategy (Alemayehu *et al*, 2001). Educational performance is most strongly associated with factors that determine access to the education system. That is, while issues of internal efficiency of education are also important, the more critical issue is to make sure children enter the schooling system in the first place (Bedi *et al*, 2002). There has been a mismatch between education expenditure and school enrolment in Kenya.

Various indicators can be used to assess the performance of the educational system. These include assessment of the educational systems' internal efficiency as measured for instance by dropout rates, its quality as measured by for instance test scores, and its external efficiency as measured by for instance social rates of return (Vos, 1996). Although such indicators are important in evaluating the overall performance of the educational system, and are indeed considered in the budget allocation, primary school enrolment is used in this study as the prime indicator of the performance of the education system.

Before the budgeting process within the Medium-Term Expenditure Framework (MTEF) was operationalized, each sector's resource allocation system was based on a line item incremental system of budgeting. This budget process principally involved adding to the previous-year increments to each line item. There was no scrutiny of the purpose of each expenditure item, and emphasis was more on inputs than outcomes. According to the Master Plan for Education and Training 1997-2010, this type of budgeting meant that unit costs per pupil or student tended to be residual as they were not planned, but merely happened without giving due consideration to the educational outputs and outcomes.

Allocation of educational resources should be based on systematically worked out strategic priorities (Government of Kenya, 1998b). Given the current economic and fiscal situation, there is need to strengthen the linkage between costing policies and programmes, planning and resourcing, budgeting, implementation and monitoring. This will ensure efficiency and effectiveness in the use of resources provided for education. In the MTEF budgeting process, budget ceilings are set and each sector has a resource envelope. Ministries in each sector bid for the resources after the constitutional budget obligations are met. The budget process is more result-oriented.

Important questions then need to be asked about allocation of resources in Kenya's education system are:

(i)   What budget resources are needed to achieve the key education target(s)?

(ii)   What is the most cost-effective way to allocate resources to meet the education targets?

(iii)   What implications does this have for the allocation of resources within the education budget?

(iv)   Is Kenya capable of meeting the Millennium Development Goal of universal primary education for all by the year 2015?

This study tries to provide some practical answers to these questions. In doing so, we focus on the issue of cost-effective ways of achieving the primary schooling targets, and address the problem of *intra-sectoral efficiency* of public spending on primary education.[2] Subsequently we assess, using the KIPPRA-Treasury Macro Model, the extent to which

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[2] We do not address the issue of *allocative efficiency* of spending within the education sector looking at priorities for primary, secondary and higher education. However, Manda, Mwabu and Kimenyi (2002) provide an assessment of educational rates of return and human capital externalities in Kenya.

the resource requirement to reach educational target remains within the overall macroeconomic budget constraints of the Kenyan economy. This study shows that achieving primary education for all is affordable for Kenya. However, given the existing budget constraints, this will require a reallocation of the government budget or borrowing from development partners.

The findings in this paper are indicative of a result-based budget planning. They are only indicative and not definitive, as one has to consider some limitations of the analysis underpinning the efficiency analysis. Furthermore, issues of implementation or *operational efficiency* will need to be considered. The best budget, from an economist's point of view, may not be executable because of, for example, lack of adequate administrative capacity. Even though the emphasis in this study is on the efficiency criteria for budget allocation, other possible limitations are also addressed.

4.   Resources for Meeting Education Targets

The new educational structure and curriculum introduced in 1984/5 led to additional education costs for parents, increased the burden of teachers, and set higher demands on the qualifications of teachers. The cost-sharing system introduced in 1988 further formalized the requirement for parents to provide school uniforms, textbooks and other instruction material, and contribute to school construction and maintenance costs. Although such cost-sharing already existed informally before 1988, the real change was in the re-introduction of school levies that had been abolished in previous years.

After controlling for a variety of individual and family characteristics, and for differences in school inputs, an analysis of school demand reveals that two factors exercise the strongest influence on the probability of being in (or having attended) school.[3] These are:

• The direct cost of school enrolment

• The availability of trained (qualified) teachers

The size of the impact of changes in these variables (elasticities) are summarized in Table 1 and are specified both for the effect on total enrolment and on enrolment by income groups. The translation of those elasticities into unit cost budget parameters is as follows:

An increase of 26 per cent in schooling costs (such as fees) would reduce overall primary school enrolment by 1 per cent (1/0.039 = 26). Those

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[3] Other variables that were tested and that can be influenced directly by education policies include school input variables such as the pupil-teacher ratio. This variable did not prove to have any significant influence. Other variables that appear to have a significant influence have to do with family characteristics (such as education of parents and wealth status), individual characteristics of the child (age and sex), and geographic location (Bedi *et al*, 2002).

Table 1: Point elasticities of demand for schooling by expenditure quintiles

	Total	Quintile 1 poorest)	Quintile 2 poorest)	Quintile 3	Quintile 4	Quintile 5
Teachers[1]						
Teacher-skill level 1 (S1)[2]						
	0.053	0.210	0.000*	0.135	-0.017*	-0.024*
Teacher-skill level 2 (P1)						
	0.381	0.661	0.688	0.252	0.456	0.177
KPCE score[1]						
	0.304	1.200	0.879	0.423	0.652	0.399
School costs (mean)						
	-0.039	-0.123	-0.066	-0.057	-0.039	-0.009*

Source: Bedi *et al* (2002)

n.s. or * = not significant. Calculations of elasticities are based on quintile specific estimates. Point elasticities are calculated at the mean of the relevant characteristic.
Notes:
1. Elasticity estimate refers to change in share of teachers by skill type. The indirect effect of more trained teachers on the KCPE score is included in the point elasticity for the teacher input.
2. Coefficients for teacher level 1 inputs were found to be insignificant for several quintiles. In the version of BNF used for the budget projections reported in this paper, the elasticity estimates found insignificant were set to zero.

costs are on average about Ksh 110 per month.[4] This implies that for school enrolment to increase by one per cent, an average subsidy of about Ksh 29 per pupil per month would be needed. However, the impact of rising costs on school enrolment differs by the welfare level of the household. A 26 per cent rise in schooling costs would lead to a fall in school enrolment of the poorest (first quintile) by 3 per cent, as they are more sensitive to rising private educational costs. Therefore,

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[4] The cost estimate is a projection at 2002 prices of the observed costs households paid per child enrolled in school in 1994 using the Welfare Monitoring Survey. The survey estimate of mean school costs is Ksh 82 per month in 1994.

in order to achieve a 1 per cent increase in school enrolment for the poorest households, a subsidy of Ksh 10 per pupil would be needed. The effectiveness of subsidies on private schooling costs decreases as households become richer. For the richest quintile, price increases have no impact on the decision to enroll in school, while there is a statistically significant effect in all other quintiles.

More qualified teachers may be expected to provide better teaching and to better administer and manage schools. This expectation appears to influence school enrolment directly. However, the school demand analysis also shows that there is an indirect effect, through higher expected test scores (KCPE), which in turn influences school enrolment positively.

To achieve a 1 per cent increase in primary school enrolment, the share of skilled teachers at level 2 (P1) would need to increase by 2.6 percentage points (=1/0.381), implying an increase of 11,827 teachers at that level (6.5%) in the year the policy change becomes effective.[5] Average salary costs of a level 2 teacher in 2002 are about Ksh 12,120 per month, implying additional budget costs of Ksh 588 per additional pupil per month, if no other changes are anticipated. Cost could be saved if the new, trained teachers replace untrained teachers. Yet, if we assume that the overall pupil-teacher ratio is to remain constant, and given that due to the policy change the school enrolment rate increases, the number of teachers will have to increase even after taking into account that untrained teachers are replaced.[6] The net increase in the

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[5] The latter estimate not only considers the effect of increasing the share of level 2 teachers, but also the overall increase in the demand for teachers as school enrolment increases, while keeping the pupil-teacher ratio constant at 33.

[6] In this scenario, we let the share of level 2 teachers increase by 3% (or about 2 percentage points), while keeping the share for level 1 and level 3 teachers constant and using that for untrained teachers as a residual.

required total number of teachers would be 6,944 (or 3.8%), implying an additional cost of Ksh 345 per month per additional pupil enrolled.

These basic parameters were introduced in the Budget Negotiation Framework, a basic tool developed to aid the budget allocation process (ISS-KIPPRA, 2001). For the purposes of this discussion, we first provide a number of scenarios for the educational budget, estimating the required resources to meet the education targets as spelt out in the Poverty Reduction Strategy. As indicated above, these targets are:

• Reaching universal primary education by 2015

• Increase net primary enrolment by 15 percent between 1999 and 2005

The first long-term target we interpret as the objective to have reached a net enrolment rate of 100 percent by the year 2015. Based on available information, we estimate the net enrolment rate at 79 percent in 2001. Assuming a gradual increase in net enrolment between 2001 and 2015, this would imply that the rate should have reached 85 percent by 2005. This is more or less consistent with the intermediate target of increasing primary school enrolment by 15 percent between 1999 and 2005, which would – at the estimated base year enrolment rate and given population projections – translate to a net enrolment rate of 83 percent by 2005. For purposes of this budget scenario analysis, which runs projections up to the fiscal year 2005/6, we use 85 percent net primary school enrolment by 2005 as the basic target. We will also show what the budget implications would be if the government was to speed up the process to reach universal primary education target (100% net enrolment) by 2005/6.

5.   Budget Allocation 2002/2003

The Poverty Reduction Strategy Paper, 2001–2004, has set targets and goals for primary education. Some of these targets include: increase enrolment rates by 2.5 percentage points per year; reduction of drop out rates by 2 percent annually; provision of 2 million textbooks covering 7 subjects each year; and provision of subsidies and establishment of school feeding programmes. These education targets are to be achieved through various strategies. Increased enrolment rates are to be achieved by reducing the burden of user charges on parents. A pro-poor textbook policy, removal of user charges on coaching and assessment, and reduction of user charges on activity and maintenance are some of the strategies of reducing the burden on parents. Reducing user charges and supplying more textbooks are policy choices, which are consistent with the findings of the decline of school enrolment study (Bedi *et al*, 2002).

In this section, we use the 2002/3 primary school budget allocations to the Ministry of Education, Science and Technology and analyze the possible impact on primary school enrolment. Primary school education was allocated Ksh 470 million for teaching materials, textbooks and curriculum development. This was higher than the 2001/02 allocation of Ksh 458 million. Assuming a constant unit cost of Ksh 200, the volume of textbooks purchased per year using allocation for teaching materials could therefore increase from 2,030,000 in 2001/02 to 2,125,994 in 2002/03 financial year, an increase of 4.7 percent.

Allocation for primary school subsidies increased from Ksh 166 million in 2001/02 to Kshs 171 million in 2002/03, implying an increase per pupil of 1 percent from Ksh 27.53 to Ksh 27.80. The subsidies include resources for the school milk and feeding programme, and boarding expenses for boarding primary schools.

During the 2002/2003 financial year, the government employed 5,000 primary and secondary school teachers. A total of 2,866 primary school teachers were hired. Assuming that all the hired primary school teachers were of level 2 (P1) category, then the total number of teachers in this level increased by 2.2 percent.

To analyze the impact of the budget on net enrolment, we run a first budget simulation using the changes in subsidies, share of level 2 (P1) teachers and volume of textbooks for the 2002/2003 financial year. We subsequently assume that during the four-year period up to 2005/6, the three budget items continue to increase at a constant rate and that the education budget is automatically adjusted for inflation. We assume further that the government would maintain a fixed pupil-teacher ratio of 33.

The budget implications are reported in Table 2. The nominal budget for primary education has to increase by 33 percent over the four-year period, but would remain constant as a percentage of nominal GDP at 3 percent.[7] Per pupil public expenditure would increase by 14 percent in real terms.

Due to these budget changes, an annual increase in the volume of textbooks by 4.7 percent, increase in the share of P1 teachers by 2.2 percent and increase of subsidies by 1 percent – the nationwide net primary school enrolment is expected to increase from 79 percent in 2001/2 to 80 percent in 2002/3, and further to 84 percent in 2005/6.[8]

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[7] GDP estimates for 2002-2005 are derived from the projections of the KIPPRA-Treasury Model (Version 2 of 13 February 2003, mid-scenario of the Economic Recovery Strategy assumptions). Under this scenario, GDP growth is projected at 1.7% in fiscal year 2002/3, 3% in 2003/4, 4.4% in 2004/5 and 5.8% in 2005/6. Improved educational investment and outcomes are not incorporated in these growth projections.

[8] Note that this further increase is due to the assumption in this scenario that the three budget inputs are increased at a constant rate in the years 2003-5.

Table 2: Budget implications of 2002/3 allocation (and constant increase of specified inputs in subsequent years)

	Budget year		Budget projections			Increase over period 2001-5
	2001/2	2002/3	2003/4	2004/5	2005/6	
Budget implications						
Primary education budget						
• (million Ksh)	27,204	29,087	31,325	33,676	36,216	33%
• (% of GDP, calender year)	3.0	3.0	3.0	3.0	3.0	
Real spending/pupil (Ksh)	4,389	4,517	4,657	4,838	5,020	14%
Macro-budget overrun						
• (million Ksh)	0	1,693	1,553	267	-1,097	
• (% of GDP, calender year)	0.0	0.2	0.2	0.0	-0.1	
Change in education inputs						
Teachers						
• Change in share of P2 level teachers (% points)		2.2	2.2	2.2	2.2	9.0
• Required overall increase(%) in number of teachers[1]		3.7	3.7	3.6	3.6	15
Textbooks (% annual increase)		4.7	0.0	0.0	0.0	4.7
School subsidies						
Quintile 1 (poorest) (%)		1.0	1.0	1.0	1.0	4.1
Quintile 2 (%)		1.0	1.0	1.0	1.0	4.1
Quintile 3 (%)		1.0	1.0	1.0	1.0	4.1
Quintile 4 (%)		1.0	1.0	1.0	1.0	4.1
Quintile 5 (%) (richest)		1.0	1.0	1.0	1.0	4.1
Educational outcome						
Net enrolment rate	0.79	0.80	0.82	0.83	0.84	6%
Quintile 1 (poorest)	0.72	0.73	0.75	0.77	0.78	9%
Quintile 2	0.80	0.81	0.82	0.82	0.83	9%
Quintile 3	0.80	0.81	0.82	0.82	0.83	3%
Quintile 4	0.83	0.84	0.85	0.87	0.88	6%
Quintile 5 (richest)	0.85	0.86	0.86	0.87	0.87	2%

Note: [1]. Assuming a fixed pupil-teacher ratio of 33.

For the poorest quintile, enrolment will go up from 72 to 73 percent in 2002/3 and to 78 percent by 2005/6. For all the other household groups, enrolment would increase to over 80 percent, with the fourth quintile achieving the highest increase of 88 percent by 2005/6. As the simulation results show, the largest improvements in enrolment would be for the first two quintiles, where enrolment grows by at least 9 percentage points. (Table 2). However, the simulated increase in the enrolment rate is clearly less than the target of 2.5 percentage points per year. The budget simulation would increase the enrolment rate by 5 points over the entire four-year period.

In other words, under the scenario of sustaining the 2002/2003-budget allocation over a four-year period, the education target of the PRSP will not be reached. The scenario comes fairly close to the intermediate target of the Millennium Development Goals (MDGs) of a net enrolment rate of 85 percent by 2005/6. The additional education cost would run over the projected government budget constraint under the baseline scenario of the KTMM model (Table 2).[9] Therefore, a number of alternative budget simulations are needed to identify the requirements to meet the PRSP and MDG targets in the most cost-effective way.

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[9] It should be noted though that under that scenario, the government would generate a budget surplus for 2002-5.

6. Alternative Budget Simulations for Meeting Education Targets

6.1 Baseline Assumptions

First we define a **baseline scenario** for which we assume the following:

- The 2002/3 budget allocation as discussed in the previous section is taken as given, but no further adjustments are introduced in subsequent years with respect to shares of trained versus untrained teachers, textbook supplies or reduction of direct school costs through subsidies or fellowships.

- The pupil-teacher ratio remains constant at 33. This implies that with no changes in net school enrolment, the required number of teachers will rise, despite the absence of policy change. Under these assumptions, the number of pupils is projected to increase with the growth of the school-going age population.

- Teacher salaries are adjusted for inflation. The inflation rate is estimated based on the KTMM projections (Model version 2, mid-scenario of Economic Recovery Strategy projections, 13 February, 2003).

- There is sufficient capacity in terms of school infrastructure (school buildings, classrooms). The budget for this (and maintenance) is allowed to increase only with average cost (inflation).

- The existing entry for 'school subsidies' is, as indicated, rather low in the base year, that is Ksh 29 per pupil per year. Actual school costs for families are much higher at Ksh 115 per pupil per month

or Ksh 1,385 per year.[10] Therefore, it would be unreasonable to assume that any increase in school subsidies at the margin of their initial level would have a significant effect on school enrolment; that is, a 1 percent increase in the current level would give a benefit of Ksh 0.28 per year, which is unlikely to constitute an incentive to send children to school. Therefore, we assume the incentive to families to send or keep children in school will rise with the importance of the subsidy to actual schooling costs. That is, the response (elasticity) to an increase in the demand subsidy is proportional to the share of the subsidy in actual schooling costs.

•   The budget allocation for 2002/3 is taken as given. In the scenario analysis, policy changes are introduced from 2003/4 onwards.

We consider the following scenarios:

I.   The share of level 2 teachers is increased to an extent it achieves the intermediate MDG target of at least 85 percent net primary school enrolment for all income groups in 2005/6.

II.   The supply of textbooks is increased to stimulate enrolment and achieve the 85 percent net enrolment target by 2005/6 for all income groups.

III.   A programme of primary school subsidies or fellowships is introduced, targeted such that all income groups reach 85 percent net school enrolment by 2005.

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[10] Based on the observed 1994 Welfare Monitoring Survey average private expenditures for primary education per pupil. At 1994 prices, this monthly schooling cost was Ksh 82. The figures in the text are at 2002 prices. These expenditures include total cost, including school fees, uniforms, textbooks, school uniforms, and 'harambee' contributions. To stay in school, not all expenditures are required. Leaving out the 'discretionary' element, Bedi *et al* (2002) estimate the minimum required expenses to stay in school at Ksh 52 per pupil per month at 1994 prices (Ksh 73 at 2002 prices).

IV.   A combination of scenarios I, II, and III such that the given target of 85 percent enrolment for all is reached by 2005.

V.   The same as scenario III, but setting the target at 100% net primary school enrolment by 2005 for the poorest 2 quintiles (instead of 2015).

VI.   A programme aimed at providing free primary education where the government covers all school costs to households (subsidies) and provision of teaching materials.

VII.   Stimulate enrolment through an additional budget allocation for primary education and ranging from Ksh 8.9 billion to Ksh 13 billion between 2003/4 and 2005/6 fiscal year

VIII.   A policy mix of textbooks provision, subsidies and increased share of trained teachers aimed at cost effective spending of the resources used for scenario VI.

The basic data for the baseline scenario are presented in Table 3, while the policy changes of each scenario is presented in Tables 4a and 4b.
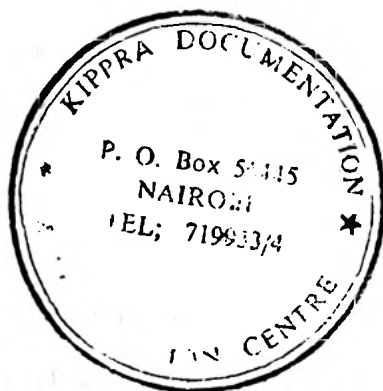
Table 3: Sectoral budget summary: Baseline scenario educational policy

	Approved budget	Budget base year	Budget projections			
Base_SIM_0	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6
Overall budget						
(Ksh million)	188,805	186,697	212,183	226,880	246,197	272,375
Agr. & rural dev.	19,133	15,114	18,407	20,485	22,901	26,531
Physical infrastructure	32,833	30,318	35,935	39,456	43,828	49,951
Human resources	64,483	68,414	78,917	86,289	94,454	106,129
Trade & industry	2,500	2,288	2,565	2,678	2,861	3,084
Public adm.	34,910	33,326	33,650	34,619	36,575	38,699
Public safety	15,450	16,746	18,779	19,269	20,252	21,457
Nat. security	19,409	20,303	23,718	23,871	25,102	26,295
IT	89	188	212	213	222	230
Human resource budget						
(Ksh million)						
Education	50,009	51,080	58,100	63,460	69,188	77,267
Health	12,448	13,272	15,819	17,366	19,202	21,927
Other human resource development	2,026	4,062	4,998	5,463	6,064	6,934
Shares (%):						
Education	77.6	74.7	73.6	73.5	73.3	72.8
Health	19.3	19.4	20.0	20.1	20.3	20.7
Other	3.1	5.9	6.3	6.3	6.4	6.5
Education budget						
Ksh million)						
Primary	26,966	27,204	29,087	30,858	32,692	34,657
Secondary	12,196	12,308	12,973	13,154	13,501	13,898
Higher	7,349	7,322	10,586	13,125	15,739	19,982
General administration	3,497	4,245	5,454	6,323	7,257	8,731
Shares (%): Primary						
education	53.9	53.3	50.1	48.6	47.3	44.9
Secondary education	24.4	24.1	22.3	20.7	19.5	18.0
Higher education	14.7	14.3	18.2	20.7	22.7	25.9
General administration	7.0	8.3	9.4	10.0	10.5	11.3
Primary educ. outcomes						
Real expenditure per pupil per year (Ksh)	4,584	4,389	4,517	4,644	4,811	4,977
Real expenditure per pupil (index)	100	96	99	101	105	109
Net school enrolment rate (total)		0.79	0.80	0.80	0.80	0.80
Quintile 1		0.72	0.73	0.73	0.73	0.73
Quintile 2		0.76	0.78	0.78	0.78	0.78
Quintile 3		0.80	0.81	0.81	0.81	0.81
Quintile 4		0.83	0.84	0.84	0.84	0.84
Quintile 5		0.85	0.86	0.86	0.86	0.86
No. of pupils (million)		6.031	6.268	6.419	6.573	6.731
Growth (%) of primary school enrolment			3.9	2.4	2.4	2.4

Cont.

Base_SIM_0	Approved budget	Budget base year	Budget projections			
	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6
Teachers		180,860	187,544	192,053	196,671	201,400
Teacher-skill level 1(S1)		20,090	20,832	21,333	21,846	22,372
Teacher-skill level 2(P1)		127,538	136,465	139,747	143,107	146,548
Teacher-skill level (P2 & P3)		30,124	27,023	27,673	28,338	29,020
Untrained teachers and level P4		3,108	3,223	3,300	3,380	3,461
Pupil-teacher ratio		33	33	33	33	33
Budget outcomes (% change, current prices						
Total primary education expend. (%)			7	6	6	6
Teacher salaries			7	6	6	6
Teaching material, texts curricul. dev.			8	4	4	4
Schools & other infrastructure			3	4	4	4
Fellowships, school meals &other subsidies			5	2	2	2

Source: Budget Negotiation Framework (BNF)

6.2   Scenario analysis

In the **baseline scenario,** the only policy change is taking into account the effect of the 2002/3 budget allocation described above and the assumption that the pupil-teacher ratio will be kept constant at 33. As there is a 'natural' growth in enrolment due to population growth, the latter assumption implies that the budget needs to expand to pay for the additional required teachers. The educational expenditure is also adjusted for expected inflation. As a result, the nominal budget for primary education would have to increase by 27 percent between the 2001/2 and 2005/6 financial years. Public spending on primary education would fall slightly as a share of GDP from 3.0 percent to 2.9 percent due to the projected acceleration of economic growth under the economic recovery strategy scenario. Due to the policy change in 2002/3, net enrolment would increase slightly from 79 to 80 percent.

Scenario I assumes an annual increase in the share of level 2 (P1) primary school teachers of 10 percentage points during the period 2003 to 2005, the increase required to reach 85 percent total net primary school enrolment by fiscal year 2005/6. In part (see above), these replaces untrained teachers. Although the overall target of net enrolment rate of 85 percent is achieved by 2005/6, there are variations across the quintiles. The share of P1 teachers increases from 73 percent in 2002 to 83 percent in 2005 and there would be no more untrained teachers. The overall net enrolment increases to 85 percent, but the poorest quintile would not have reached the target, attaining a net enrolment rate of only 80 percent. The primary school education budget would have to rise by 36 percent between 2002 and 2005, implying an average annual increase of about 0.1 percent of projected GDP. This would lead to a budget overrun against the macro-economic budget constraint of the same magnitude, therefore requiring a redefinition of budget priorities.

Scenario II has the volume of primary school textbooks increased by almost 500 percent during the period 2003 to 2005. In doing so, by 2005/6 two pupils would share one (new) textbook, well beyond the PRSP target of 2.5 pupils per textbook.[11] The outcome is that by 2005/6 the target of an overall net enrolment rate of 85 percent is reached. However, only the two richest quintiles would have reached the goal, leaving the poorer segments still off the PRSP target. Nonetheless, this policy option is more expensive than scenario I, as by 2005/6 the primary school education budget would have to be increased by 41 percent, as compared to the 2001/2 budget – the base year. The average additional cost per year amounts to 0.2 percent of GDP. Therefore, the violation of the macroeconomic budget constraint will also be more severe.

Under **scenario III**, the amount of subsidies per pupil would have to increase substantially to reach the target level of 85 percent school enrolment. In this scenario, we exclude the richest quintile from the benefits of the subsidy. We first bring the subsidy to a level where families are expected to respond to some visible degree to the subsidy (see section 6.1 for baseline assumptions). For the poorest two quintiles we let the subsidy increase to Ksh 667 per year and the third and fourth quintile get half of that. Introduction of these subsidies raises overall net school enrolment from 79 percent to 85 percent in 2005. The resultant net enrolment in 2005 for all quintiles is at least 85 percent. This scenario is more expensive than the previous two. It reaches a budget level in 2005/6 that is 45 percent above the 2002/3 budget for primary education. The required budget increase is equivalent to 0.2 percent of GDP on average per year for the period between 2002 and 2005. Although it is more expensive, it is more equitable and effective than the previous

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[11]This is probably more than adequate since the simulated increase refers to new textbooks, which may be re-used in a number of years.

two scenarios; it reaches the intermediate PRSP target for all income groups.

It would probably be unwise to rely on one policy instrument to enhance access and quality of primary school education. Therefore, under **Scenario IV,** the three policy instruments are combined. The share of trained teachers (P1) is increased by 5 percentage points over the period. The volume of textbooks is increased by 39 percent over the period, reaching a ratio of 8.5 pupils per textbook (still off the PRSP target). The government subsidy is increased to Ksh 334 per pupil per year for the poorest two quintiles only. There is no subsidy increase for the richest three quintiles. This combination of the three policy changes reaches the education target of 85 percent net primary school enrolment for all by 2005. The implied additional costs are the same as under scenario II, but at greater benefit, and cheaper than scenario III for an even slightly larger overall outcome, and equally equitable. The budget for primary education would have increased by 41 percent by 2005/6 and the additional cost to reach the education target would be 0.14 percent of GDP per year.

6.3   Achieving 85 percent net enrolment by 2005

Overall, the four scenarios imply additional budget allocations for primary education and at a small apparent overall economic cost of between 0.1 and 0.2 percent of GDP. However, the way this additional allocation is spent has important implications on equity. The target of 85 percent net enrolment is reached in each scenario, but not all income groups would have reached the intermediate Millennium Development Goals. Improving teacher quality would be the least expensive scenario (I), but less beneficial to the poor. Focusing on just improving textbook supplies (scenario II) would be the more expensive option, but children from poor families would not reach the enrolment target. Reducing

schooling costs is more equitable but also much more costly than the previous two scenarios, unless targeted. We have not considered the possible cost related to the targeting scheme (e.g. means testing) that would need to go with such a policy. Most sensibly, the government would combine the three policy instruments (scenario IV). The results show that at an annual cost of about 0.1 percent of GDP, Kenya would afford getting on track by 2005/6 in reaching the primary-education-for-all target. However, the additional cost would be beyond the limits of fiscal constraints for 2003-5, therefore requiring adjustment in budget priorities to reach the goal.

6.4   Universal Primary Education for the Poorest Groups by 2005

Under *scenario V*, simulated policy changes are designed such that under the given educational model assumptions, net primary school enrolment would reach 100 percent for the two poorest quintiles in 2005/6. One possible set of policy combinations to achieve this target is to raise, first, the share of level 2 teachers from 73 percent to 85 percent between 2002/3 and 2005/6 and, second, quadruple the volume of textbooks over the same period nearing the PRSP target of 2.5 pupils per textbook. Further, demand subsidies need to be raised to Ksh 500 per pupil per year for the first three quintiles. Clearly, additional resource demands for primary education will be substantially higher under this scenario. In nominal terms the budget would have to increase by about 67 percent over the period, requiring some Ksh 45 billion more than the 2002/3 budget and some Ksh 10.6 billion more than under the baseline scenario (Table 3). The annual additional cost amounts to about 0.5 percent of GDP. The overall number of primary school teachers would have to increase by 28 percent (about 50,000 teachers) as shown in Table 6 and Figure 8. Total net enrolment would be expected to reach 95

Table 4a: Changes in policy instruments for scenarios I, II, III and IV

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*
Scenario I										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.00		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.04		0.04		0.02	
Teacher-skill level 3(P2 & P3)	17%		-0.02		-0.04		-0.03		-0.02	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.01		-0.01	
Teaching materials, texts, curriculum dev. (million)	0.603	200	0.05	0.03	0.00	0.04	0.00	0.04	0.00	0.04
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.05		0.04		0.03	0.04
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.160	0.00	1.229	0.00	1.279	0.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.301	0.00	1.380	0.00	1.438	0.00
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.315	0.00	1.364	0.00	1.405	0.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.414	0.00	1.482	0.00	1.535	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.380	0.00	1.426	0.00	1.467	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*	*Volume*	*Unit costs*
Scenario II										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.00		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.00		0.00		0.02	
Teacher-skill level 3(P2 & P3)	17%		-0.02		0.00		0.01		0.01	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.01		-0.01	
Teaching materials, texts, curriculum dev. (million)	0.603	200	0.05	0.03	1.50	0.04	0.50	0.04	0.50	0.04
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.04		0.03		0.03	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.188	0.00	1.241	0.00	1.297	0.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.310	0.00	1.362	0.00	1.415	0.00
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.325	0.00	1.366	0.00	1.409	0.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.425	0.00	1.476	0.00	1.528	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.395	0.00	1.438	0.00	1.482	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario III										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.00		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.00		0.00		0.02	
Teacher-skill level 3(P2 & P3)	17%		-0.02		0.00		0.00		0.00	residual
Untrained teachers & level P4	2%		0.00		0.00		0.00		0.00	
Teaching materials, texts, curriculum dev. (million)	0.603	200	0.05	0.03	0.00	0.04	0.00	0.04	0.00	0.04
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.06		0.04		0.04	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.197	5.00	1.259	1.00	1.356	1.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.301	5.00	1.351	1.00	1.423	1.00
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.339	5.00	1.388	1.00	1.421	0.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.410	5.00	1.456	1.00	1.491	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.367	0.00	1.400	0.00	1.433	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario IV										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.02		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.02		0.02		0.01	
Teacher-skill level 3(P2 & P3)	17%		-0.02		-0.04		-0.01		0.00	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.01		-0.01	
Teaching materials, texts, curriculum dev. (million)	0.603	200	0.05	0.03	0.10	0.04	0.10	0.04	0.10	0.04
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.05		0.04		0.04	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.202	2.00	1.274	1.00	1.355	1.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.291	2.00	1.360	1.00	1.428	1.00
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.339	0.00	1.382	0.00	1.422	0.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.400	0.00	1.454	0.00	1.501	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.375	0.00	1.417	0.00	1.456	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

Note: Shaded areas refer to either fixed values (base year) or estimations endogenous to simulated policy change

percent. Only the first two quintiles are targeted to reach 100 percent access to primary education.

Resource-wise, this scenario could still be feasible but will require a much stronger political priority for primary school education. Increasing trained teachers from 73 percent to 85 percent in just three years (2003-5) and quadrupling textbook supply is, however, a big challenge. Also, this scenario (as well as all previous ones), underestimates the actual cost of increasing access to primary education and assuring adequate quality at the same time. At least two types of costs have not been fully accounted for in scenarios I-V. First, textbook supply is based on initial estimates of textbooks covering one subject only rather than the 6 core subjects taught. Second, the cost of maintenance and improvement of school buildings and infrastructure have not been accounted for. Targeting the poor is also a complicated issue, which also involves administrative costs. Therefore, the above cost estimates for reaching the PRSP targets are conservative. In the next section, we correct for the full costing of textbook supplies under the scenarios for education for all.

6.5   Free primary school education for all

Scenarios VI, VII and VIII simulate the budget implications of providing free primary school education for all, as suggested by the government, under alternative scenario assumptions. In *scenario VI* we assume that the government will cover *all* school costs to households, therefore requiring a subsidy of Ksh 73 (2002 prices) per pupil *per month* to be

adjusted for inflation each year.[12] In addition, the scenario further assumes that the government will expand subsidies for curriculum support, including free delivery of textbooks for all 6 subjects, reaching an average target of 2.5 textbooks per pupil.[13] In addition, as proposed by the government, additional support would be supplied in the form of free access to exercise books, training materials for teachers, free supply of pencils, pens, rulers, geometry material, and free supply of chalk and equipment for physical education. As summarized in Table 5, the estimated cost of subsidizing these educational inputs amount to about Ksh 1,167 per pupil per year (at 2002 prices). Currently, families pay for the cost of textbooks, exercise books, etc. Therefore, free provision of these inputs will reduce schooling costs to families. We assume the cost of such free provisioning of inputs is included in the demand subsidy of Ksh 73 per pupil per month. Deducting this amount from the total cost of educational inputs, a residual cost for other curriculum support (teacher guides, etc.) of Ksh 71 per pupil per year is left to be included in budget estimations. In this scenario, we assume that all pupils in primary school, whether rich or poor, benefit from the subsidy.

In *scenario VII*, the starting point is the additional budget allocation for primary education of Ksh 7.9 billion for 2003/4, Ksh 10.5 billion for 2004/5 and Ksh 13 billion in 2005/6 (*The Daily Nation*, 25 March 2003). Under this scenario, we assume that these resources are used to enhance textbook supply and other curriculum support and the difference to provide untargeted demand subsidies.

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[12] Only the minimum required expenses to stay in school are considered (see footnote 8).

[13] This target would allow for effectively having one textbook per pupil, assuming textbooks can be reused for at least two or three years.

Table 5: Estimated cost of curriculum support under the education for all programme

Curriculum support	Level	Target	Terms/ year	quantity (millions)	Unit cost	Cost 2003 (Ksh million)
Textbooks	Upper primary (6 subjects)	1tb/2 pupils	year	10.950	240	2,628
	Lower primary (6 subjects)	1 tb/3 pupils	year	7.300	200	1,460
Exercise bks	Upper primary (6 subjects)	1eb/1 pupil	term	65.700	23	1,511
	Lower primary (6 subjects)	2 eb/1 pupil	term	65.700	14	919
Pencils	Primary	1 pen/1 pupil	term	21.900	10	219
Rubbers	Primary	2 rub/1 pupil	term	4 3.800	10	438
Pens	Primary	1 pen/2 pupils	term	10.950	50	547
Chalks	Primary	1 box/class	year	196,935	100	20
Teacher guides	Primary (6 subjects)	1 guide/class	year	196.935	45	
Teacher prep. books	Primary	1 pb/teacher	year	172.406	34	
Geometry sets	Primary (upper)	1 set/1 pupil	year	3.650	100	365
Assessment cards	Primary	1 card/1 pupil	year	7.300	15	110
Rulers	Primary (Upper)	1 ruler/1 pupil	year	3.650	10	37
Registers	Primary	1 reg / class	year	0.197	45	9
Creative arts & PE	Primary	1 eq/school	year	17.754	10,000	178
	Total					8,520
	Average cost per pupil (Ksh/year)					1,167

Scenario VIII proposes an alternative, more cost-effective spending of the resources used for scenario VI, using a policy mix similar to that of scenarios IV and V, with increases in trained teachers, enhanced textbook supplies and both demand subsidies and curriculum support expenses benefiting the poorest three quintiles. In all scenarios, we maintain the assumption of a constant pupil-teacher ratio of 33.

The cost implications of free primary education for all under scenario VI are vast. In nominal terms, the annual budget would have to increase by about 91% over the period, requiring Ksh 23 billion by the fiscal year 2005/6, more than the 2002/3 budget, and some Ksh 17 billion more than under the baseline scenario (Table 6). The annual additional cost would amount to about 0.8% of projected GDP (Table 6). At a fixed pupil-teacher ratio, the overall number of primary school teachers would have to increase by almost 27 percent (about 49,000 teachers) as shown in Figure 8. Total net enrolment would reach 94 percent. Clearly, this (untargeted) policy scenario is relatively expensive and except for the poorest quintile, none of the income groups would reach 100 percent net enrolment under the given assumptions.

The budget allocation for the free primary education programme will not be sufficient to reach the target of complete enrolment by 2005/6 under the assumptions of *scenario VII*. The additional annual cost amounts to 0.4 percent of GDP (close to that of scenario V), but the untargeted subsidy increase would only yield an increase of net enrolment to 86 percent by 2005/6, and the poorest quintile (Q1) would not even reach the intermediate PRSP target of 85 percent.

The alternative spending of the estimated additional budget cost under the assumptions of *scenario VIII*, would lead to a net enrolment rate of 97 percent, with the poorest three quintiles all reaching 100 percent net enrolment. The amount of additional resources in this scenario is the same as under scenario VI (0.8% of GDP)[14]. The reason that this scenario is more expensive than scenario V is due to the fact that under scenario V, the cost of textbook supplies for all six subjects and other curriculum support is not fully accounted for. Clearly, the more targeted allocation

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[14] Although Scenario VI and VIII use the same amount of additional resources, scenario outcomes (net enrolments) are different as the additional resources are spent differently.

of the budget is much more effective than scenario VI. Further investment in teacher quality (either in public or private schools) might be needed to also reach 100 percent net enrolment for the richer two quintiles. Assuming such families can afford greater contributions, we could argue that the marginal social cost of achieving universal primary education for all is in the order of 0.8 percent of GDP.[15]

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[15] This estimate excludes the cost of maintenance and improvement of school buildings and other infrastructure.

Table 4b: Changes in policy instruments for Scenarios V, VI, VII and VIII

| | Base yr. values | | Annual increments (%) | | | | | | | |
| | 2001/2 | | 2002/3 | | 2003/4 | | 2004/5 | | 2005/6 | |
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario V										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.03		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.05		0.05		0.01	
Teacher-skill level 3(P2 & P3)	17%		-0.02		-0.08		-0.03		0.00	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.02		0.00	
Teaching materials, texts, curriculum dev. (million)	0.603	200	0.05	0.03	0.10	0.04	0.50	0.04	0.10	0.04
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.09		0.06		0.06	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.309	3.50	1.452	1.00	1.601	1.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.375	3.50	1.520	1.50	1.686	1.50
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.399	3.50	1.479	1.00	1.563	1.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.453	0.00	1.548	0.00	1.623	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.402	0.00	1.462	0.00	1.513	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

| | Base yr. values | | Annual increments (%) | | | | | | | |
| | 2001/2 | | 2002/3 | | 2003/4 | | 2004/5 | | 2005/6 | |
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario VI										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.00		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.00		0.00		0.00	
Teacher-skill level 3(P2 & P3)	17%		-0.02		0.00		0.02		0.00	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.02		0.00	
Teaching materials, texts, curriculum dev. (million)	0.603	214	0.05	0.03	1.20	0.04	0.60	0.04	0.10	0.04
Other curr. support (Ed. for all prog. 2003, vol. means estim. no. of enrolled pupils (millions)	0	71	0.00	0.03	6.803	0.04	7.153	0.06	7.895	0.07
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.07		0.04		0.10	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.252	5.00	1.348	1.00	1.603	1.92
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.346	5.00	1.423	1.00	1.588	1.92
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.361	5.00	1.423	1.00	1.564	1.92
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.446	5.00	1.514	1.00	1.635	1.92
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.396	5.00	1.444	0.00	1.502	1.92
Pupil-teacher ratio assumption	33		33		33		33		33	

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario VII										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.00		0.00		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.00		0.00		0.00	
Teacher-skill level 3(P2 & P3)	17%		-0.02		0.00		0.02		0.00	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.02		0.00	
Teaching materials, texts, curriculum dev. (million)	0.603	214	0.05	0.03	1.20	0.04	0.60	0.04	0.10	0.04
Other curr. support (Ed. for all prog. 2003, vol. means estim. no. of enrolled pupils (millions)	0	71	0.00	0.03	6.803	0.04	6.992	0.06	7.185	0.07
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.07		0.03		0.13	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.252	5.00	1.290	0.00	1.329	0.00
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.346	5.00	1.384	0.00	1.424	0.00
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.361	5.00	1.397	0.00	1.433	0.00
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.446	5.00	1.486	0.00	1.527	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.396	5.00	1.432	0.00	1.470	1.92
Pupil-teacher ratio assumption	33		33		33		33		33	

	Base yr. values 2001/2		Annual increments (%) 2002/3		2003/4		2004/5		2005/6	
	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs	Volume	Unit costs
Scenario VIII										
Target shares teachers by level	100%									
Teacher-skill level 1(S1)	11%		0.00		0.01		0.01		0.00	
Teacher-skill level 2(P1)	71%		0.02		0.06		0.05		0.04	
Teacher-skill level 3(P2 & P3)	17%		-0.02		-0.07		-0.04		-0.03	residual
Untrained teachers & level P4	2%		0.00		0.00		-0.01		-0.01	
Teaching materials, texts, curriculum dev. (million)	0.603	214	0.05	0.03	1.00	0.04	0.80	0.04	0.41	0.04
Other curr. support (Ed. for all prog. 2003, vol. means estim. no. of enrolled pupils (millions)	0	71	0.00	0.03	2.789	0.04	3.004	0.06	8.129	0.07
New schools & other infrastr.	881	1.0	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.04
Fellowships program & other demand subsidies (incl. school meals) (million)	6.036	28	0.04		0.09		0.06		0.08	
Targeted at quintile 1 (poorest) (million)	1.044	28	1.093	0.01	1.332	5.25	1.485	0.25	1607	0.50
Targeted at quintile 2 (million)	1.169	28	1.225	0.01	1.414	5.25	1.553	0.75	1.675	0.60
Targeted at quintile 3 (million)	1.226	28	1.266	0.01	1.358	0.00	1.439	0.00	1.676	10.50
Targeted at quintile 4 (million)	1.295	28	1.347	0.01	1.462	0.00	1.562	0.00	1.645	0.00
Targeted at quintile 5 (richest) (million)	1.295	28	1.335	0.01	1.405	0.00	1.469	0.00	1.524	0.00
Pupil-teacher ratio assumption	33		33		33		33		33	

Note: Shaded areas refer to either fixed values (base year) or estimations endogenous to simulated policy change

Table 6: Summary of scenario analysis: Budget implications and education outcomes

	Baseline	Scenario						
		II	III	IV	V	VI	VII	VIII
Budget implications								
Required primary educ. budget increase 9Ksh million, 2005/6 budget compared to 2002/3)	5,569	7,880	9,326	10,269	9,239	16,210	22,890	11,212 18,831
Average additional cost 2002-5 (as % of GDP)	-0.1	0.1	0.1	0.2	0.1	0.5	0.8	0.4 0.7
Real spending per pupil (Ksh) by 2005/6	4,977	5,052	5,377	5,333	5,219	5,673	6,528	5,523 5,914
Change in education inputs								
Teachers								
Change share of P2 level teachers (% points)	2	12	2	2	7	15	2	2 16
Required overall increase No. of teachers (growth rate, %)	11	17	15	18	18	28	27	17 30
Required overall increase No. of teachers (abs. Number)	20,540	30,792	26,351	32,572	32,151	50,066	49,424	30,201 53,495
Textbks (growth rate, %)	5	5	489	5	39	340	416	205 431
Other spending on curricul. support (Ksh per pupil per year) by 2005	-	-	-	-	-	-	86	86 86
School subsidies (Ksh/pupil per year by 2005/6)								
Quintile 1	28	28	28	667	334	500	974	167 487
Quintile 2	28	28	28	667	334	782	974	167 487
Quintile 3	28	28	28	334	28	500	974	167 320
Quintile 4	28	28	28	334	28	28	974	167 28
Quintile 5	28	28	28	28	28	28	974	167 28
Educational outcomes (by 2005/6)								
Pupils per textbook	10.7	11.3	2.0	11.3	8.5	3.0	2.5	3.9 2.5
Pupil-teacher ratio (assumption)	33	33	33	33	33	33	33	33 33
Gross prim. sch. enrolment rate (%)	90	95	95	95	96	107	105	96 109
Net primary sch. enrolment rate (%)	*80*	*85*	*85*	*85*	*86*	*95*	*94*	*86 97*
Quintile 1 (%)	73	80	81	85	85	100	100	83 100
Quintile 2 (%)	78	85	84	85	85	100	94	85 100
Quintile 3 (%)	81	84	84	85	85	93	93	85 100
Quintile 4 (%)	84	89	89	87	87	94	95	89 96
Quintile 5 (%)	86	88	89	86	87	91	90	88 91

7. Macro Constraints and Education Resource Requirements

The education sector has faced various financial constraints in the last two decades. Given the tight budgetary situation in Kenya, it is important to adopt a cost-effective approach in allocating resources. The Ministry of Education, Science and Technology has had an inherent problem in allocation of resources to programmes and projects due to many on-going projects and budget ceilings from the Treasury. The Ministry has not been able to allocate resources based on policy decision, to the extent that over 95 percent of primary school education recurrent budget goes to payment of teachers salaries (Kimalu *et al*, 2001).

The scenario analysis conducted in this study has shown that educational targets can be reached at an affordable cost. Keeping the time horizon for the goal of universal primary education for all at 2015, an additional cost-effective allocation of between 0.1 and 0.2 percent of GDP would be required. A fast track achievement of this goal by 2005/6 could amount to 0.8 percent of GDP. The budgetary space for this would mean resetting budget priorities. It would, however, also be conceivable that it makes economic sense to increase borrowing for such an increase in social investment. Studies for Kenya estimate the private returns to primary education at 5 percent or more (Manda *et al*, 2002) and, to the extent that this would reflect enhanced labour productivity, this should yield enough additional economic growth to cover the cost of borrowing.

8. Conclusion

Kenya has made enormous progress in education since independence in terms of increased number of schools and pupils enrolment. Due to the continuous expansion of the education sector, the share of public expenditure on education has been rising over the years. However, the main concern has been lack of cost-effectiveness in resource allocation in the education sector. We have used the Budget Negotiation Framework (BNF) in our analysis to suggest cost-effective ways of resource allocation to achieve education targets.

In the analysis, we have only emphasized the resource implications of trying to reach the targets of universal primary education based on an economic model of determinants of school attendance. This only provides one ingredient to the decision-making process. The underlying policy implications will have to be assessed further in terms of the existing capacity to implement these policies within the suggested timeframe. Hiring of better-trained teachers may take time and it may equally be difficult to step up textbook supplies in large quantities. Further, if policies could move further in that direction, the precise mechanisms and their feasibility of targeting school subsidies (or reduction of school charges) will need to be analysed. Subsequently, the behavioural response of families to enhanced demand subsidies will have to be closely monitored.

Education policy in Kenya is already moving in the indicated direction as reflected, among other things, in the PRSP. What we have tried to show in this study is that, first, existing efforts would have to be stepped up to actually achieve the education targets, and, second, there is need to explicitly link the policy changes to their budget implications.

From the analysis, it seems that achieving universal primary education by 2015 is a feasible target for Kenya. If the primary education budget

is used in a cost-effective way, an additional resource allocation of 0.2 percent of GDP is required to reach the intermediate target of 85 percent net enrolment by 2005/6. Assuming a continued, essentially public-provided primary education system by 2015, the additional cost may increase to 0.5 percent of GDP, most of which would be needed to pay for the additional cost of teachers required to train the increasing pupil numbers. The key ingredients to reach the given goals would be improvement of teacher quality (more trained teachers) and greater supplies of textbooks and subsidies (targeted) for poor families to enhance access to education. However, the actual cost in this scenario should not underestimate the true cost of expanding the educational system to ensure quality. The additional cost for adequate textbook supply (for all 6 subjects) and other curriculum support (chalks, writing materials, etc.) would lead to a marginal cost of 0.8 percent of GDP. The cost of maintenance and improvement of school buildings would need to be added to this cost.

Kenya's free public primary education programme, which is now being implemented, has led to improved enrolment rates. However, scenario VI on free primary education seems a much more costly option with less medium-term effect on net enrolment rates compared to Scenario VIII, which uses the same amount of resources. If one should interpret such a move - free primary education - as the government subsidizing all school cost for families, ensuring free supply of basic teaching materials and not jeopardizing quality (such as keeping class size at a reasonable level), could imply an additional annual cost as high as 0.8 percent of GDP, but without reaching educational targets as scenario VI suggests.

However, even if resources are spent in the most cost-effective manner, the budget for primary school education will have to be increased structurally. Given the existing budget constraints, this will require

resetting of budget priorities for which the benefits of greater investment in primary education will have to be weighed against other priorities. The general argument here is that, from a purely economic point of view, the private and social returns to education are high enough to warrant granting sufficient priority to primary school education.

The present analysis on cost-effectiveness in resource allocation — primary education — was based on the school enrolment behaviour as derived from the Welfare Monitoring Survey held in 1994 (Bedi *et al*, 2002). An update of that survey is needed to probe the validity of the basic assumptions for the budget scenario analysis and to monitor the impact of the policy changes. Despite these obvious limitations, the analysis shows the usefulness of having an education demand and cost model, and a Budget Negotiation Framework, to think through the budget implications of adjusting education targets and the reallocation of various budget components.

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